UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NEEDLES FIELD OFFICE

ENVIRONMENTAL ASSESSMENT

PROPOSED INSTALLATION, OPERATION, AND MAINTENANCE OF THE SHEEP HOLE MOUNTAINS S.D. BIG GAME GUZZLER SAN BERNARDINO COUNTY, CALIFORNIA

CA-690-EA03-24

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INTRODUCTION

The California Department of Fish and Game proposes to install one big game guzzler in the Sheephole Valley Wilderness. The S.D. big game guzzler would be located in the northwest side of the Sheep Hole Mountains by Sheep Hole Pass. The proposed water development would consist of a small dam, a pipeline, a buried 10,000-gallon storage tank, and a wildlife accessible subterranean drinker. An access way would also be required for the construction, operation and maintenance of the sites.

1. **CONTROL NUMBER:** CA-690-EA03-24

2. **CASE FILE / SERIAL NUMBER:** CA42960

3. **PROPONENT:** California Department of Fish and Game

4. **PROJECT:** Sheep Hole Mountains S.D. Big Game Guzzler

5. **LOCATION:** Sheep Hole Mountains; T2N, R12E, S34 NW1/16 NE1/4, SBBM

6. **AFFECTED ACREAGE:** 2.3 Acres

7. **7.5' QUADRANGLE:** Dale Lake

8. **MULTIPLE-USE CLASS:** Controlled

9. **LAW ENFORCEMENT SECTOR:** 92

10. **LAND STATUS:** Public

11. **SPECIAL DESIGNATION AREA(s):** Sheephole Valley Wilderness, California Desert Conservation Area

12. **AUTHORITY:** 16 United States Code (U.S.C.) 410 (*California Desert Protection Act of 1994*), 16 U.S.C. 670 (*The Sikes Act of 1960, as amended* 1978) and 16 U.S.C. 1131(Wilderness Act of 1964) and, 43 U.S.C. 1701 (*Federal Land Policy Management Act of 1976*)

13. LAND USE PLAN CONFORMANCE:

The proposed action is subject to and in conformance with the *California Desert Conservation Area Plan of 1980* (CDCA Plan), as amended, in accordance with Title 43 Code of Federal Regulations 1610.5-3.

Objective #1 of the Wildlife Element of the CDCA Plan is to "Avoid, mitigate or compensate for impacts of conflicting uses on wildlife populations and habitats and to promote wildlife populations through habitat enhancement projects so that balanced ecosystems are maintained and wildlife abundance provides for human enjoyment."

Objective #2 of the Wildlife Element of the CDCA Plan, in part, is to "Develop and implement detailed plans to provide special management for: "b) areas with habitat which is sensitive to conflicting uses…"

Objective #3 of the Wildlife Element of the CDCA Plan is, in part, to "Manage those wildlife species on the Federal and State lists for threatened and endangered species and their habitats so that the continued existence of each is not jeopardized." The desert tortoise, which may be adversely affected by the proposed project, is federally listed and State-listed as a threatened species.

Objective #4 of the Wildlife Element of the CDCA Plan is to "...manage those wildlife species officially designated as sensitive by the BLM for California and their habitats so that the potential for Federal or State listing is minimized." desert bighorn sheep is a California State "sensitive species" and is shown on Table 3 in the Wildlife Element of the CDCA Plan.

The *California Desert Protection Act* (CDPA) provides the overriding management guidance for the Sheephole Valley Wilderness. The CDPA Title 1, section 103 (f) states: "Management activities to maintain or restore fish and wildlife populations and the habitats to support such populations may be carried out within wilderness areas designated by this title and shall include the use of motorized vehicles by the appropriate State agencies."

14. PURPOSE AND NEED FOR PROPOSED ACTION:

The purpose and need for the proposed action as stated by the California Department of Fish and Game (CDFG) is that two water sources (big game guzzlers, or BGGs) for bighorn sheep are immediately necessary based on sheep utilization of the ranges, inadequate capacity of the current systems, and unpredictable rainfall patterns that may or may not fill existing systems and or natural tanks. The proposed S.D. guzzler (Maps 1A, 2A) is the first of the two BGGs that CDFG wishes to construct.

Bighorn sheep have been extirpated from many of their traditional ranges since the 1880s and numbers continued to decline in the past, primarily because of the deterioration and fragmentation of the habitat and over hunting. Bighorn sheep populations fluctuate, depending upon the quality of food and water, weather, disease, and human activities (primitive roads, mines, recreation sites, military activities). Since the 1930s, transplanting of desert bighorn sheep, along with habitat manipulation (primarily the installation of large game guzzlers) has been used to return the species to its former range. However, some populations have not increased or have become extinct, rather than increasing in numbers. Dunn (1996) attributes this to inadequate habitat assessment.

Table 1 – Number of Bighorn Sheep/Year in the Sheephole Valley Wilderness
(data based on survey polygons completed by air)

Year	Estimated Number of Sheep
1940	42
1946	15
1957	15
1971	12
1982	12
1993	59
1999	82
2000 (July)	19
2000 (October)	36
2001 (September)	53
2002 (September)	53

CDFG has estimated the number of resident animals within the Sheephole Valley Wilderness to range from a low of 12 in 1971 to a high of 82 in 1999 (Table 1, above). Population counts vary depending upon the season that surveys were accomplished, as well as population fluctuation. Management activities have been successful in restoring sheep numbers in the Sheephole Valley Wilderness, but due to habitat fragmentation, scarce water resources, and heavily utilized present artificial water sources (Map 3A), these activities are proving inadequate to maintain

the level of population that CDFG feels would meet past recorded levels.

The 1980 CDCA Plan established the Sheephole/Cadiz Wilderness Study Area, and on October 31, 1994, Congress designated the wilderness study area as the Sheephole Valley National Wilderness Area (See Map 1A).

In 1984, the Sheep Hole Mountains Habitat Management Plan was approved, and allowed for the transplanting of 27 sheep from the Old Dad Mountain Range to the area. This plan was general in scope and was comprised mainly of issues regarding management of bighorn sheep in the Sheephole/Cadiz Wilderness Study Area. It did not address the effects of creating a series of new water sources across the landscape, the effects upon the biology and ecology of sheep populations, or the effects upon other wildlife species, including the desert tortoise, which presently inhabits the range of bighorn sheep.

BLM authorized the first CDFG installation of a BGG (Suds Hole) in 1982. In 1993, CDFG was authorized to install the Bear Claw BGG and transplant another 15 sheep into the wilderness study area. During 1995 and 1996, repairs were made and additional storage tanks were placed at Suds Hole and Bear Claw guzzlers (Map 3A).

In 2000, The Sheephole Valley Wilderness was opened to the hunting of bighorn sheep for the 2000-2001 hunting season. Presently one license is issued per year for the wilderness area.

In July of 2000, CDFG discovered a die-off of 15 sheep within the Sheep Hole Mountains population. The sheep were located within one mile of an artificial water source which was dry due to lack of rainfall at that site that year. Lack of necropsy data on sheep found dead is problematic due to rapid decomposition. CDFG and Desert Wildlife Unlimited surmised that the mortalities were water-stress related but without definitive necropsy evaluations were unable to verify this conclusion.

In the fall of 2000, CDFG requested that six new guzzlers be installed within the Sheephole Valley Wilderness to maintain and enhance the bighorn sheep population in that area. In response, BLM requested that a meta-population plan be completed before installation of any additional guzzlers.

Due to the die-off, inadequate capacity of the existing water systems and other factors, the CDFG urged the consideration of the installation of two proposed big game guzzlers, the S.D., to be located within the Sheep Hole Mountains, and another to be called Upper Surprise, in the Calumet Mountains, as a preventative measure without meta-population plans in place. CDFG expressed concerns that populations of bighorn sheep in the area would be at risk of future die-offs, due to lack of water, if supportive water supplies were not in place during drought years at the new sites. The BLM agreed to consider these guzzlers but affirmed that no further new developments would be allowed until a meta-population plan was completed. Also, in 2001, the BLM agreed to monitor water levels and re-fill if necessary, the two existing big game guzzlers in the Sheep Hole Mountains

pending consideration of the two proposed guzzlers. A total of three re-fills were performed in 2001-2003.

15. PROPOSED ACTION AND ALTERNATIVES:

15.1 Proposed Action:

The CDFG proposes to construct, operate and maintain one big game guzzler, to be named S.D., in the Sheephole Valley Wilderness (Maps 1A, 2A). The proposed water development would consist of a small dam, a pipeline, a buried 10,000-gallon storage tank, and a 2,000 gallon wildlife accessible subterranean drinker (Figure 1). The total area of impact for the construction site would include a 75 x 75 yards around the installation (dam, tank, drinker), as well as an additional 50 X 50 yard adjacent to the work site for vehicle turnaround and camping. In addition, in order to access the proposed project site, a total of 0.6 acres (0.5 mile) would be directly or indirectly affected, either by cross-country travel or along a pre-existing dirt way once utilized as an access road to a now defunct mine.

1. Excavation of Site

The flat ground would be excavated and backfill materials would be placed to the side of the trench, away from the wash in an old vehicle turn around area west of the site. The tank and drinker would be placed in the trench, which would be excavated lower than the dam area and the excavated rock and soil would be replaced and smoothed back to the original flat level, with the installation buried as described below.

The installation site would be excavated for the burial of a 10,000-gallon fiberglass tank and a 2,500-gallon drinker. Both would be buried to a depth of at least two feet, except for an exposed 1.5-inch screened U-vent pipe on the storage tank and a lip, opening and concrete apron for the drinker (Figure 1). All excavated materials from the cavity formed for the installation of the tank and drinker will be placed on the turnaround. The tank will be placed at the rear of the cavity, which will be excavated to a depth lower than the slope wall adjacent to the wash. The drinker will be set 10 feet away and below the level of the tank. Excavated rock and soil will be replaced and smoothed, so that the buried tank and drinker will become part of the slope.

The 50 foot wide wash will be partially dammed. Construction of this dam will require 25 bags of Portland cement. The site area is located approximately 25 feet away from the wash, on flat ground located adjacent to and west of the wash area. Fifteen feet of ABS pipe will run from the base of the dam to a Y connector leading to both storage tank and drinker. Ten to 20 feet of ABS would be required for each branch leading to each storage area.

2. Storage Tank and Drinker

The 10,000-gallon storage tank would be a custom-built 30 feet long x 8-feet diameter fiberglass cylinder. The drinker would be comprised of a 2,500-gallon, 16 feet long by 4 feet wide by 8 feet deep fiberglass tank with a ramp. The drinker would be buried underground, 10 feet from the tank, and the two would be connected by a 4-inch flexible PVC pipe, with only the walk-in drinker opening being exposed. The apron is at the entrance of the drinker opening and would be the width of the drinker, 4 feet extending 6 to 8 feet to the front. At the entrance would be the ramp with steps so that animals that have access to the water can escape easily. The steps would be 2 feet wide and would be 1 foot apart and run down the center of the drinker ramp. The 2 remaining feet, one on either side of the steps are rough concrete per side and are sloped in conformance with the slope of the drinker incline. The concrete steps would be constructed on-site, utilizing approximately eight bags of Portland cement for the ramp.

3. Dam

Runoff from the seasonal rainfall would be checked behind the dam and flow through a buried six-inch ABS pipe into the tank. The ABS pipe would be located at the base of the dam catchment with the entry hole covered with wire mesh, to prevent entry of foreign materials. Water would run through the pipe, which would be buried two feet deep, until it reaches the slope where the tank and drinker would be buried. After the tank and the drinker are filled, subsequent runoff would flow over the dam and down the wash.

The dam would be constructed of concrete and faced with native stone collected at the site, so as to blend into the surrounding landscape. The dam dimensions would be the width of each wash, 18 inches high and comprised of cement and native sand collected at each site from the wash areas immediately above the dam construction site. Approximately 20 5-gallon buckets of sand would be removed from this site. Mobile water tanks would be utilized to haul all water for construction purposes and would be towed to the sites by vehicle. Water used during construction for mixing cement would be gravity fed from the tanks. Cement would be mixed using a gasoline engine cement mixer and conveyed to the dam site by wheelbarrow. A minimal amount of wastewater would be generated. Natural forces are anticipated to fill in the upstream side of the dam with wash materials, to replace those removed for construction and for mixing concrete.

4. Construction Equipment, Vehicles, Access

Excavation equipment would consist of a Case 680 rubber-tired backhoe and a model 740 John Deere flat-tracked excavator. The mobile water tank would be a 1,000-gallon capacity high-density plastic tank on a trailer with a motorized pump used for initial charging of the drinker. Eight pick-up trucks would be utilized to carry work tools (shovels, picks, rakes), tow one 1,000 water tank and one portable gas-powered cement mixer, and transport staff to the site (one trip per vehicle). Access would be via an existing primitive historic mining road and by desert wash (a total of approximately 0.5 miles).

5. Rehabilitation of Sites

All work areas would be flagged and would be reclaimed upon completion of the construction phase. Upon the completion of the project, disturbed areas would be re-vegetated with the native plants that would be removed during construction. Any rocks that would be removed would be scattered over the disturbed area. At the wilderness boundary all vehicle tracks would be raked out.

6. Camping

An overnight base camp would be established within the wilderness at the site for a maximum of one night. The base campsite would be located in an area clear of vegetation, as near to the treatment area as feasible, and within the 50-yard turnaround. A total of 16 people would be at the work area for a maximum of two days for the installation with all workers camping for one night. All trash would be contained in predator proof containers and removed when leaving the site. Supplies, tools and materials would be stored, when not in use, at this location and a first-aid/safety area would be established here also. Cooking would be on gas stoves with no open fires allowed. Personnel sanitation and disposal of items for one night would follow standard Leave No Trace/Wilderness Practices (All disposable items would be packed out).

7. Monitoring

Representatives of the Society for the Conservation of Bighorn Sheep (SCBS) would walk into the site from the wilderness boundary to monitor the new BGG twice each year for water level and quality. Other monitoring would consist of pellet transect, photographic data, and guzzler operation. The proposed BGG is anticipated to require little maintenance after the initial construction phase, because there are no moving parts intrinsic to the system, almost all of the pieces would be buried, and system pieces are resistant to degradation and leaking would be almost nil.

Monitoring reports would be filed through the SCBS Waterhole Coordinator. Copies would be sent to the Department of Fish and Game Wildlife Habitat Management Crew and also to the BLM Needles Field Office and California Desert District Biologists. Monitoring trips would utilize the same trail at all times. At the wilderness boundary any vehicle tracks would be raked out. BLM Rangers and Department Wardens would patrol the area to control unauthorized use of the way.

15.2 Alternative One:

CDFG would install the big game guzzler in the Sheephole Valley Wilderness as described in the proposed action. Helicopters rather than motorized ground vehicles would be used for transporting workers and their hand tools, small materials and supplies. Trucks would be used to tow the cement mixer, the 10,000-

gallon storage tank, the 1,000-gallon water tank, and the drinker to the site. The rubber-tired backhoe and flat tracked excavator would be driven in. Installation is projected to take one day longer, would cost considerably more due to the increased use of a helicopter, and would be accomplished with the same number of workers as with the proposed action. Monitoring, maintenance, and repair would be the same as in the proposed action; however all access would be by foot or helicopter.

15.3 No Action Alternative:

The proposed new big game guzzler would not be constructed. The two existing artificial water sources in the Sheep Hole Mountains would continue to be maintained. Existing management and use of the sites would continue, subject to applicable statutes, policy, and land use plans.

15.4 Alternatives Considered But Eliminated From Detailed Analysis:

An alternative considered but eliminated from detailed analysis was the installation of the big game guzzler as described in the proposed action, but no mechanized equipment would be used for installation and no motorized ground vehicles would be used. Installation activity would take longer and more workers would be required than with the proposed action. Workers would walk to the work site and all materials and supplies would be carried or packed in, except for the tank and water, which would be flown to the site using a helicopter. Monitoring, maintenance, and repair would be the same as in the proposed action; however all access would be by foot or horseback.

This alternative was eliminated from detailed analysis due to lack of feasibility. Specifically, transportation of the proposed equipment using pack animals or via wagon over the sandy access ways was considered infeasible and soils are too hard to be dug by hand.

16. AFFECTED ENVIRONMENT

The following elements of the human environment, subject to review specified in statute, regulation or executive order, are not located within the project area: Ecologically Critical Area, Floodplains, Prime or Unique Farm Lands, Wetlands and Riparian Zones, and Wild and Scenic Rivers.

16.1 Air Quality

The Mojave Desert Air Quality Management District has state air quality jurisdiction over the project area, rules that apply to this project, and permitting requirements. Air quality throughout the project area is generally good. At times, that the area does not meet air quality standards due to locally generated and/or wind transported pollutants. The vicinity in which the proposed action is located is

currently classified as a federal non-attainment area for ozone and PM-10 under national standards.

16.2 Biological Resources

Plant Species

The plant assemblage is a creosote bush-white bursage series (Sawyer, 1995), which is a component of the Sonoran Creosote Bush Scrub, characteristic of the Colorado Desert.

Plants found in the immediate area include creosote bush (*Larrea tridentata*), Pursh plantain (*Plantago purshii*), red three awn (*Aristida longiseta*), *Euphorbia spp*., brittlebush (*Encelia farinosa*), range ratany *(Krameria parvifolia*), desert lavender (*Hyptis emoryi*), desert milkweed (*Asclepias sublulata*), white bursage (*Ambrosia dumosa*), beavertail cactus (*Opuntia basilaris*), pencil cactus (*Opuntia ramosissima*), cholla (*Opuntia spp*.), and *Cryptantha spp*. Data collected from line-intercept transects showed vegetative cover at 32%. Of that*, Plantago purshii* comprised 46%, *Encelia farinosa* 8%, *Cryptantha spp*. 4%, and *Aristida longiseta* comprised 3%.

Perennial riparian vegetation is not present at the site proposed for construction of the BGG. A small seep occurs in the northeastern Sheep Hole range and is overgrown with canary grass (*Polypogon monspeliensis)*, a weedy exotic. A small amount of squirrel grass (*Sitanion hysterix*), a native species, was also found at the seep. Otherwise, the only naturally occurring standing water known within the ranges is in the form of tinajas, which fill in winter and spring and dry in the summer. Wildlife species depend on these areas for food, water, and/or shelter.

Invasive/Nonnative Plant Species:

Several invasive species such as Mediterranean grass (*Schismus* sp.) are already established in the vicinity of the proposed project.

Plant Species of Concern

Foxtail or beehive cactus, *Coryphantha vivipara var alversonii*, a plant species of Federal concern, was observed on bajadas adjacent to the S. D. site. *Crossosoma bigelovi* exists in T.1N. R.12E. Section 12, within the Sheep Hole Mountains, but was not observed near (within ½ mile) of the proposed project area.

Wild and Free-Roaming Horses And Burros

There are no wild and free-roaming horses and burros present in the vicinity of this proposed action or its alternative.

Wildlife

No big game species' sign other than bighorn sheep (*Ovis canadensis nelsoni*) was noted within the proposed project area, and none are known to have inhabited the area in recorded times, due primarily to the scarcity of natural water sources. Wildlife species include a variety of small mammals, reptiles, and non-game birds

including ravens (*Corvus corax*), sparrows (*Spizella sp., Amphispiza, sp.*), and other passerine birds. Presently, a few water dependent bird species exist within the immediate area of the proposed site, as as water sources exist within a few miles of the area. Raptor species that may inhabit the area include red-tailed hawks (*Buteo jamaicensis)*, prairie falcons (*Falco mexicanus*), and turkey vultures (*Cathartes aura*). There are no small mammal species that are federally and/or state threatened or endangered within the proposed project area.

A large nest site, believed to be a raven's, was located on the east cliff side of the canyon within 1,000 feet of the proposed S.D. project site. It appeared to be in good condition, but at the time of the survey, the site was vacant.

Reptiles including whip-tailed lizards (*Cnemidophorus tigris*), gopher snakes (*Pituophis melanoleucus*) and rattlesnakes (*Crotalus sp.)* have ranges and habitat overlapping the proposed project area.

<u>BLM Wildlife Sensitive and California Species of Special Concern (SSC).</u>

1. Prairie Falcon *(Falco mexicanus)* - SSC, LeConte's thrasher *(Toxostoma lecontii) – BLM Sensitive*

The proposed project is within the range of these species and there is suitable nesting and foraging habitat present.

2. Chuckwalla *(Sauromalus obesus) - SSC* and Rosy Boa *(Lichanura trivirgata*) - SSC

The proposed project is within the range of these species, and there is habitat for the chuckwalla and rosy boa in broken rock areas at and adjacent to the site. Habitat is not optimum for these species, and none were seen on or within broken rock or rock face areas during examinations of the site.

3. Desert Bighorn Sheep (*Ovis canadensis nelsoni*) – *BLM Sensitive*

Natural History of Bighorn Sheep (adapted from Dunn 1996 and others)

Nelson's bighorn sheep are an indigenous species found throughout the Sheephole Valley Wilderness. In the past, sheep populations in the Sheep Hole Mountains have fluctuated from an estimated low of 12 individuals in 1940 to an estimated high in 1999 of 82 animals, with an occasional animal counted in the Calumet Mountain Range.

Food, water and cover, in the form of escape terrain are essential components of sheep habitats. Bighorn sheep are essentially associated with precipitous mountainous areas, which are used for escape terrain and protection during lambing periods, and open steep terrain is the defining component of a habitat. Slopes of less than 60% serve as foraging areas and as corridors between patches of escape terrain, which are usually greater in slopes of 60%. Bighorn sheep are

foraging generalists; their diets vary seasonally, as well as throughout the geographic range. However, like all ruminants, bighorn sheep do best with highly nutritious forage and therefore can be adversely affected by poor range conditions where the quality, quantity, and diversity of forage are low.

Sheep utilize both perennial and ephemeral forage when it is available. Some of the main perennial plants present at the sites that may be key forage plants for sheep would include range ratany, white bursage, desert lavender, catclaw acacia, and cattle spinach. Sheep also utilize cactus species for the water content, and have been documented traveling in areas without water for at least 10 days (deVos 1997). Data suggests that bighorn sheep can survive the driest seasons without free water by supplementing their water demands by eating cacti (deVos 1997 Warrick and Krausman 1989, Watts 1979).

It has been documented that sheep utilize several ranges for seasonal foraging, watering, and lambing purposes (A. Cooperrider et.al., 1986; V. Bleich et.al., 1990). V. Bleich states that, "...the ecological value of mountainous habitats not permanently occupied should be recognized." and that "...tracts of 'traditional' habitat that are not permanently occupied should be recognized as potential seasonal habitat and as 'stepping stones' within migration corridors." According to A. Cooperrider, "Annual ranges of mountain sheep populations tend to consist of up to seven or more seasonal ranges and their connecting corridors." This is reflected in helicopter flyovers when the numbers of sheep noted in early spring in winter ranges are much greater than the resident numbers seen in mid-summer. Therefore, an absence of sheep within a range as noted by a lack of seasonal survey sightings, is not a result only of lack of water, but also caused by migration of the animals from a seasonal area when not only water, but, quality forage, mating areas, shelter, and appropriate lambing areas are unavailable.

Bighorn sheep require separate foraging grounds with a moderate to higher quality food supply at different times of the year if they are not to over-utilize an area, particularly within desert regions where such areas are limited. As activities (such as lambing) require different habitat needs, animals migrate over large distances seeking appropriate habitats. The lack of a population within a specific area at a certain time of year may not be indicative of the nature of the persistence of other nearby populations; but rather an indication of territorial usage at certain times of year. The more arid the habitat is, the larger a territory may be, and a particular subpopulation might be several miles and ranges away from a particular use area.

Predators of mountain sheep occurring within their range include mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and golden eagle (*Aquila chysaetos*). Of these predators, the mountain lion is not documented within either proposed project area. Coyotes appear to be the main predator upon weakened animals and lambs, with golden eagles and bobcats occasionally preying upon lambs. Hunting of bighorn sheep within the Sheephole Valley wilderness may be considered as a form of predation.

Specific Presence at the Proposed Project Site

Evidence of utilization of forage was noted. Forage utilization and the vigor and abundance of key species may be impacted around water sources or on high-use animal trails due to soil compaction from trampling and cropping of vegetation, as seen at the other BGGs in the area. Presently sheep tracks and trails were found in the washes and hillsides near the area. Since domestic livestock animals have not grazed the area for many years, the trend in vegetation condition in areas of past use has had a chance to attain an upward or static trend.

On August 21, 2001, ground reconnaissance at the S.D. site revealed minimal use of the area. Old forage patterns indicate an over utilization of the area within the past, although the area appears to be recovering. Tracks and old crumbly pellets were noticed within the area. Forage in the area showed recent minimal browse patterns. On January 10, 2002, a second survey at the S.D. site revealed fresh tracks and increased recent shrub foraging at the proposed site at the mouth and well within the canyon. This area appears to be used intermittently during migration, as Sheep Hole Pass is a migratory route between the Sheep Hole and Bullion Mountain ranges (Bleich et.al.1990).

Threatened and Endangered Habitat/Species - Desert Tortoise:
Mojave populations of the desert tortoise (*Gopherus agassizii*) were listed as threatened on April 2, 1990, and the U. S. Fish and Wildlife Service designated Critical Habitat for the species on February 8, 1994. The proposed project is not located within designated critical habitat (USFWS 1994), or BLM designated Category 1 or 2 habitats. No burrows were noted at the proposed BGG site, which is partially located within unsuitable habitat, but sign was noted along the proposed way. Table 2 shows the amount of desert tortoise habitat affected by the proposed action, by activity:

Table 2: Acres of Desert Tortoise Habitat Affected by the Proposed Action

Area	Acres DT Habitat Affected	Unsuitable Habitat Affected
Sheep Hole (S.D.) Way (wilderness) Proposed Project	 0.3 0	 0.3 1.7
Monitoring Activities (travel biannually through habitat on foot)	0	0
Total Habitat Affected	0.3	2.0

On August 21, 2001, a survey was conducted at the S.D. site to determine if desert tortoises were present within the area. No burrows or signs were seen at the site, but scat and burrows were noted along the proposed access route. Conditions at the proposed S.D. site are unsuitable as tortoise habitat. Results of permanent density transects completed by K. Berry (1996) in the Amboy region just north of the proposed project site indicate a tortoise density of four tortoises/square mile on the bajadas in the area, as of 1988.

Because of the presence of burrows and sign, portions of the proposed project are considered to be Category 3 habitat, pursuant to 1989/1990 CDCA Plan Amendment 19.

Raven Predation

The Sheep Hole Mountain raven population is high, due to the presence of a large human population base within 5 miles and a highway within a mile of the proposed S.D. site. Ravens were seen patrolling the road, as well as noted at the proposed site. A raven nest was seen approximately 0.2 miles up the canyon from the proposed S.D. site.

16.3 Cultural Resources

On August 21, 2001, an archaeological pedestrian survey was conducted on the proposed S.D. access route and game guzzler construction site. Historic resources identified in the project area included an historic era temporary campsite and an historic mining access roadway. The campsite, situated on a low-lying ridge within the drainage at the base of the Sheep Hole Mountains, is comprised of a light historic debris scatter and 4 to 5 cleared tent pads. Surface artifacts suggest that the campsite was utilized sometime between 1900 and 1940. The historic campsite may have been occupied by miners employed at the mine site situated within the unnamed canyon above the proposed big game guzzler construction location.

The historic dirt way that provides access from the drainage/wash at the base of the Sheep Hole Mountains, upslope to the proposed big game guzzler construction location, was constructed to provide access to the historic mining operations in the same area. Portions of the historic way were stabilized with low-lying drywall rock construction. A vehicle “turnout” was constructed at the base of the canyon walls immediately adjacent to the proposed big game guzzler location. The turnout was graded on a ridge adjacent to the historic way to provide a means for vehicles going up or down the single lane way to pass one another prior to entering the canyon. The amount of rock drywall construction necessary to build the historic way increased dramatically as it passes up slope above the vehicle turnout and proposed guzzler location and into the canyon. This access way and vehicle turnout were determined to be not eligible for nomination to the National Register of Historic Places.

16.4 Geology, Minerals, and Soils

A pre-Cenozoic sequence of granitic and metamorphic rocks dominates the Sheep Hole Mountains. The metamorphic rocks in this sequence consist of gneiss and schist with scattered inclusions or pendants of marble and quartzite. Many of the mines, prospects and mineralized areas in the Sheep Hole Mountains are

associated with contact zones of the Cadiz Valley Batholith where it intrudes meta-igneous and meta-sedimentary rocks. Only small sub-economic base and precious metal vein type deposits are known to exist. Scant past mining was limited to small hydrothermal fissure fill gold veins. There has been no documented production from any mine or prospect in the Sheep Hole Mountains. The area was withdrawn from mineral entry, except for valid existing rights, with the passage of the California Desert Protection Act in 1994. Soils of the area are thin and poorly developed with boulders strewn over much of the area.

16.5 Hazardous Materials

No hazardous materials are known to be present at the proposed BGG or access to the site.

16.6 Health and Safety

Proposed action activities are located in remote areas with difficult access by vehicle. Heavy equipment would be used. Workers would use hand tools and powered equipment and be involved in strenuous physical labor. The terrain varies from sandy wash to steep and rocky. The nearest hospital would be in Twentynine Palms, 24 miles from the S.D. site.

16.7 Land Use

Livestock Grazing
The Sheep Hole Mountains are not located within a BLM grazing allotment.

Public Services and Utilities
The Sheep Hole Mountains are within a designated wilderness area and no Rights-of-Way (ROW) for public services or utilities are located within the project area. No impacts are anticipated for this proposed action or its alternatives regarding public services and utilities; therefore a description of an affected environment has not been included.

Recreation
Recreation use within the Sheephole Valley Wilderness is dispersed and at low levels. The area is accessible throughout the year for recreation, however the use season is typically from September through April. Activities include big and small game hunting, hiking, and camping. There are no developed trails or facilities within or adjacent to this wilderness area. The area's lack of springs and large size make wilderness travel a challenge for the most experienced desert hiker. Nearly the entire boundary is defined by vehicle routes ranging from 4-wheel routes to Highway 62, a paved 2-lane highway. Presently, one permit is issued each year to outfitters for the Desert Bighorn Sheep Hunt sponsored by the CDFG. Sheephole

Valley Wilderness is a favored wilderness destination for members of Desert Survivors. Desert Survivors has led 4 multi-day back- packing trips into the Sheephole Valley Wilderness since its 1994 designation.

16.8 Noise

Noise is currently generated in the area by vehicles traveling on Highway 62, Amboy Road. Sounds from these roads can be heard within Sheephole Valley Wilderness near the southeast, southern, and western boundaries. The Amboy Road separates Sheephole Valley Wilderness, to the east, and the U.S. Marine Corps Air Ground Combat Center (MCAGCC), to the west. It is a corridor often used several times per day by military aircraft for training purposes. These aircraft include propeller driven cargo transports, combat and transport helicopters, and fighter jets. Their sounds can be heard throughout much of the wilderness. Since the airspace over the MCAGCC is closed to civilian aircraft, private civilian aircraft fly over the wilderness east of Sheep Hole Pass. Although less frequent and higher altitude than the military aircraft, their sounds can be heard throughout the wilderness. CDFG periodically flies helicopters into the Sheephole Valley Wilderness area for purposes of bighorn sheep management. These activities include population census, capture for data collection and radio collar installation, release of transplant animals, and maintenance (including re-filling) of the two existing artificial waters. CDFG and their agents use ground vehicles in the Sheephole Valley Wilderness twice annually to inspect the two existing artificial waters and in support of capture activities. BLM periodically flies over the Sheephole Valley Wilderness in fixed wing aircraft as part of wilderness monitoring and, more recently, used helicopters to re-fill the two existing artificial waters. Noises from CDFG and BLM activities that involve use of aircraft can be heard throughout much of the wilderness area. Noises from CDFG activities using ground vehicles can be heard in the wilderness area near the actual activity.

16.9 Paleontological Resources

No impacts are anticipated regarding paleontological resources for this proposed action or its alternatives; therefore a description of an affected environment has not been included.

16.10 Environmental Justice

No minority communities or low income communities are located within or adjacent to the proposed project area.

16.11 Visual Resources

The Sheep Hole Mountain range is a steep, boulder-strewn, granitic mountain mass. The highest elevation reaches 4,600 feet. Common landscape features include washes with steep and rocky slopes, and open, flat and sandy lands. Vegetation is sparse and not a dominant element in the landscape. There is no

visible water coming from the mountains or in the valley between the Sheep Hole and Calumet Mountains.

In accordance with the 1980 CDCA Plan, the area now encompassed by the Sheephole Valley Wilderness was rated at a VRM Class III and IV, with class "B" to "C" scenic quality and moderate to high sensitivity levels. Upon designation as wilderness, the area falls within the definition of VRM Class I with a high sensitivity level to changes. Key observation points include Amboy Road to the west of the wilderness, U.S. Highway 62 along the southern boundary, a pipeline maintenance road along the northern boundary, and the Patton Road along the eastern wilderness boundary. No key observation points have been described for the interior of the wilderness. Interior observation points constitute where a visitor may see the proposed facilities and access ways from within the wilderness.

The S.D. project area is located in view of the Amboy Road on the south side of Sheep Hole Pass however the guzzler itself would not be visible from the road. Observation of the site would be from viewpoints in the immediate area. The area has landscape features remaining from human activity, which include an historic way to a now-abandoned mine site and the features associated with a small hard-rock mining operation.

16.12 Water Resources

Surface Water

No perennial streams occur in the areas of the proposed sites. Stream runoff occurs only during periods of precipitation. The nearest rainfall record is from the National Weather Service station in Twentynine Palms, approximately twenty miles from Sheephole Valley Wilderness. As shown on the table below, precipitation records indicate that there were 18 months where precipitation exceeded 0.5 inches in the 95 months between January 1994 and November 2001 (inclusive). Only 10 of those months indicate accumulated rainfall for the of 1.0 inch or more. There is no established correlation between the accumulations and surface runoff, as it is not known whether the precipitation came in a single short event or several long and less intense events throughout the month.

Table 3 – Precipitation within the Sheep Hole – Calumet Range Area

	Jan	Feb	Mar	Apr	May	Jun	Jly	Aug	Sep	Oct	Nov	Dec
1994	0.15	0.47	0.50	0.00	0.31	0.00	0.00	1.06	0.20	0.00	0.16	0.88
1995	2.13	0.86	0.29	0.18	0.00	0.00	0.07	0.03	0.13	0.00	0.00	0.00
1996	0.05	0.03	0.12	0.00	0.02	0.00	0.49	0.37	0.00	0.03	0.25	0.06
1997	0.51	0.01	0.00	0.38	0.64	0.01	1.05	1.34	3.96	0.00	0.17	0.47
1998	0.25	1.25	0.82	0.01	0.03	0.00	0.65	0.00	0.28	0.04	0.03	0.15
1999	0.03	0.40	0.00	1.37	0.02	0.02	1.11	0.03	0.39	0.00	0.00	0.00
2000	0.02	0.33	0.16	0.00	0.00	0.00	0.00	2.28	0.03	0.47	0.00	0.00

2001	0.86	1.33	0.29	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.01	0.46

Source: National Weather Service, California Department of Water Resources, California Data Exchange Center

Groundwater

Depth to ground water at the proposed site is unknown, however Cadiz Dry Lake, immediately east of the Calumet Mountains, has water very near the surface and is the location of evaporative extraction salt mines. No existing human uses of ground water occur in close proximity to the proposed site. Recharge to ground water occurs during periods of precipitation from runoff along stream courses and washes.

16.13 Wilderness

The Sheephole Valley Wilderness is l74,800 acres in size and is located 20 miles east of Twentynine Palms, California. Sheephole Valley separates the Sheep Hole Mountains and Calumet Mountains. The Sheep Hole Mountains are a steep, boulder-strewn, granitic mass. Bighorn sheep are found in this wilderness, as are desert tortoise, and as "BLM sensitive species" and Federally listed "Threatened Species", respectively, are "special features" within this wilderness. The area lacks springs and other permanent water sources. With the exception of two existing artificial water sources, Sheephole Valley Wilderness is currently being managed consistent with the definition of wilderness in Section 2c of the Wilderness Act: "... retaining its primeval character and influence, without permanent improvements or human habitation which is protected and managed so as to preserve its natural condition..." There are some pre-designation vehicle tracks (now closed to motorized vehicles) within the wilderness, abandoned mines, as well as the two BGGs for bighorn sheep. CDFG currently uses approximately 14 miles of those vehicle tracks for motorized access to the two existing artificial waters.

The Sheephole Valley Wilderness has been difficult to close to illegal vehicle use. Gates and barriers are installed by Needles Field Office staff and removed by unknown individuals. Boundary and route closed signs are shot, cut down, burned, and otherwise defaced and destroyed. Vehicle tracks into the wilderness continue to be used illegally.

Periodic low-level flights of military aircraft occur above the wilderness and CDFG conducts activities related to desert bighorn sheep management. These include inspection and maintenance of the existing BGGs and a regular population census. Bighorn sheep research is conducted by CDFG, which includes the capture and release of bighorn sheep, taking blood samples, and attaching tracking collars. These activities involve the use of helicopters and/or ground vehicles operating within the wilderness.

This area is one of several areas open to the hunting of bighorn sheep and other small game. There are up to five small hunting parties that annually enter the wilderness area on foot or horseback for that purpose. There is also illegal entry by motor vehicle, particularly at the south and southeast part of the wilderness. Vehicles are driven on existing vehicle tracks now closed by the wilderness designation or, to a lesser degree, cross-country. The BLM is taking steps to eliminate illegal vehicle entry through installation of gates and barriers, public education, and impact rehabilitation. The open, flat, and sandy lands on the south,

east, and north borders of the wilderness provide no natural barriers to vehicles and make BLM's control efforts more difficult.

The site of the proposed S.D. guzzler is on the west side of the Sheep Hole Mountains, located in a granitic narrow rock and sand wash, about 50 feet in width, with steep and rocky side slopes that support little vegetation, at an elevation of approximately 2,000 feet. The wash egresses directly onto the bajada above the Dale Lake area. There is no permanent water at this site; however two other big game guzzlers, as well as several tinajas exist within five miles of the proposed project area. In addition, there are several private residences at the wilderness boundary within two miles of the proposed project which provide water for wildlife. An abandoned mining way exists that leads to a small abandoned mine with features at and within one mile of the proposed site. The mining features are readily visible from anywhere within the wash. The forces of nature are gradually erasing them. The site is about 0.5 mile from Amboy Road, a paved two-lane road between Amboy and Twentynine Palms, so sounds of vehicles can be heard at the proposed guzzler site. The road is mostly used by passenger traffic as an alternative route from southern California to Las Vegas, Nevada. The west slope of the Sheep Hole Mountains, which contain this site, face the Twentynine Palms training facility for the Marine Corps and Sheep Hole Pass is commonly used for low-altitude flights of a variety of military aircraft. Although opportunities for solitude are somewhat compromised by the sounds of civilization, the site is visually screened from all current human activity. Aircraft and highway sounds, when present, infringe on a visitor's sense of solitude and isolation.

Use of motorized vehicles in this wilderness has reduced opportunities for solitude. Currently, motorized vehicles or equipment are used for monitoring and repair of existing artificial waters within this wilderness an estimated 8 days per year. Sheep population surveys and other activities using helicopters impact the opportunity for solitude an estimated additional 4 days per year. Operations to manually fill existing guzzlers when they are dry have occurred in the past and involve 2 to 6 days of helicopter use in each year requiring filling operations, additionally reducing opportunities for solitude. Further impacts to solitude exist from unauthorized vehicle use. Measures taken on the ground have reduced this but it is estimated that there are still at least 2 incursions per month, or 24 days per year. The current estimate is that there is a total of 38 days each year, or 10% of the time, when opportunities for solitude are impacted by vehicle use, both authorized and unauthorized, within the wilderness.

17. ENVIRONMENTAL CONSEQUENCES: Proposed Action

17.1 Air Quality

The excavation would generate small amounts of PM-10 emissions for the few day period of construction. The operation of engines to power the backhoe, cement mixer, and trucks would generate unknown levels of particulate and other emissions during the period of construction. Vehicle use on the access way would generate PM-10 emissions during the monitoring period. However, due to the short period of construction and minimal monitoring activities the quantity of PM-10 and other emissions would be minimal. Control measures are not necessary to reduce emissions. The proposed action would not exceed deminimus emission levels and no further conformity determination is necessary. No impacts are anticipated regarding air quality for the proposed action.

17.2 Biological Resources

Plant Species

Perennial plants present at the sites - including range ratany, white bursage, cattle spinach, and catclaw acacia could become utilized frequently as bighorn sheep forage. Ephemeral forage when it is available, could also be utilized more heavily than in the past. Existing vegetation in areas of heavier usage could show a negative change in vigor and biomass, and could cause a type conversion of the vegetation.

If use of ephemeral and annual plants by sheep increases, *Crossosoma bigelovi* could be affected in the Sheep Hole Mountains. Foxtail or beehive cactus, *Coryphantha vivipara var alversonii*, a plant species of Federal concern, could also be affected if plant use by sheep increases and they utilize it for forage. Usage for water content would be offset, however due to the presence of an available water source nearby.

Construction activities, including use of vehicles, could affect existing vegetation along the proposed route. Plants within the wash could be damaged by equipment. Soil berms could be created and existing vegetation could be partially buried.

Seeds of invasive or nonnative species may be introduced during activities involving soil disturbance. Equipment may also inadvertently transport seeds. If invasive or nonnative species become established as a result of this proposal, impacts to native plant communities in the area would reduce natural biodiversity and vegetation production. If not eradicated or controlled, effects could include: deterioration of wildlife habitat, displacement of threatened and endangered species, reduction of plant and animal diversity because of weed monocultures and disruption of neo-tropical migratory bird flight patterns and nesting habitats.

Threatened and Endangered Species - Desert Tortoise

Mitigation measures would be applied from the FWS *Small Disturbance*

Programmatic BO 1-8-97-F-17 to the S.D. BGG project (see Mitigations section, below), which has a disturbance of 2.3 acres, 0.25 acres of which is along a primitive track, and 0.35 acres of which is within desert tortoise habitat, primarily within a wash.

Effects Resulting from Creation of a Tire Trackway

The proposed action would create a tire trackway in the wash, approximately 0.35 miles long to provide access to the primitive historic way which accesses the site, in the Sheephole Valley Wilderness Area. The creation of this way could increase the amount of illegal vehicle traffic in the wilderness area. This could negatively impact both desert tortoises and bighorn sheep by providing access into a previously undisturbed area, increasing disturbance to bighorn in the form of human harassment, poaching and collecting as well as cause the introduction of weedy species via vehicle traffic. Using the access way at S.D. for emergency maintenance means that this way would not be returned to the land base as possible habitat.

Effects Resulting from Introduction of a Permanent Water Source

Under the proposed action, year-round water would be provided for bighorn sheep and other resident animals, including birds and mammals such as quail, coyote, bobcats, and fox, as well as ravens and desert tortoises. Some of these species especially ravens and coyotes (Turner et. al. 1987) are known to prey upon the desert tortoise. As desert tortoises are attracted to water sources, such sites could become attractive ambush areas for ravens and coyotes as well as foxes, badgers, and other raptors that prey on both young and adult tortoises. Evidence exists for increased predator abundance in response to water development in the southwest (deVos 1997), especially for raptors.

Under the proposed action, range expansion and better habitat utilization are anticipated to occur for bighorn sheep. This may or may not facilitate an unnatural increase in the size of herds within the area, which could affect vegetation resources. Artificial water sources could cause the expansion of other grazing/browsing wildlife species or increase the size of species presently occupying habitat at the proposed sites. Thus far, studies of the effects of artificial water sources upon wildlife populations are minimal, so effects remain speculative, although it is known that improvement in water resources, in general, cause a corresponding increase in wildlife populations, especially those of some birds and mammals (deVos 1997). As forage within the area is limited, an increase in wildlife populations dependent upon forage resources could result in a reduction in food resources for desert tortoises, as a result of increased competition. As studies are lacking in the long-range effects of providing artificial water sources in the desert, effects remain speculative.

Although the effects of over utilization of forage by populations of bighorn sheep are not specifically documented (visits to big game guzzlers have indicated that this is occurring), a parallel can be drawn between the effects of heavy foraging by bighorn

sheep and overgrazing by other hoofed animals, such as domestic sheep and cattle (Avery and Neiberg 1997). Heavy foraging can cause loss of canopy cover, as browsers remove and trample cover shrubs, reducing overstory biomass (see vegetation analysis above). Burge (1977) and Berry and Turner (1984, 1986) have described the importance of cover in providing cover and shade for burrows and tortoises. Young tortoises especially require shrub cover, as their burrows are close to the surface, and could be negatively impacted. Effects of trampling would occur primarily during migration activities, as bighorn sheep cross desert tortoise habitat to access different ranges.

Invasive/Nonnative Plant Species

Several invasive species such as Mediterranean grass (*Schismus* sp.) are already established in the vicinity of the proposed project. The chance of this plant or other invasive/non native species becoming more widespread as a result of the project is medium to low.

Wild and Free-Roaming Horses And Burros

The proposed action is not within an established Herd Management Area and no wild and free-roaming horses and burros are known to be present in the area. Accordingly, no impacts are anticipated regarding wild and free-roaming horses and burros for the proposed action.

Wildlife

1. General

The project may result in mortality of small mammals such as desert kangaroo rats, (*Dipydomys sp.*) and deer mice (*Peromyscus sp.),* which have burrows adjacent to some construction areas. Other small wildlife species, such as snakes, lizards and small bird species could be impacted as a result of an increase in vehicular travel, both directly and indirectly associated with the proposed project. Small birds, reptiles, and mammals would be expected to benefit from a permanent water source within an area where no permanent water presently exists or has existed in the past.

2. Prairie Falcon (State Species of Concern), LeConte's Thrasher (Sensitive)

As there are multiple natural and man-made sources of water within the region, the addition of a permanent water source probably would have little effect upon populations within the area, as these birds can travel considerable distances. The proposed project activities could affect breeding and nesting activities, due to timing of the proposed project. Nesting habitat would not be removed.

3. Rosy Boa and Chuckwalla (both State Species of Concern)

Based upon absence at the proposed project site, independence of both species from water requirements, and proposed conservation measures, neither species would be affected by proposed activities, and might receive a small benefit from a

slight increase of prey species due to the availability of water. Due to the potential for unauthorized vehicle activity along the same ways, the proposed action could directly and indirectly result in mortality of these species from occasional run-overs

4. Bighorn Sheep (Sensitive)

There are two aspects of the proposed action affecting bighorn sheep; 1) the installation, inspection, and maintenance of an artificial water facility and 2) the increased availability of water through a network of artificial waters. The installation of an artificial water source could have a number of effects on bighorn sheep. The proposed project would potentially allow bighorn sheep in the Sheep Hole Mountains to expand and better utilize more of their range for foraging purposes over a larger part of the year, and would be part of a chain of artificial drinkers between mountain ranges.

Effects of Installation, Inspection, and Maintenance

Construction, inspection, and maintenance activities could result in temporary abandonment of the area by bighorn sheep. Establishment of vehicle tracks to the S.D. site could also result in illegal vehicle use.

Reaction of bighorn sheep to human disturbance varies greatly and may be affected by the type and frequency of disturbance, season of occurrence, amount of habitat affected, position of disturbance to the sheep to escape terrain, and degree of habituation (Papouchis et al. 2000, King and Workman 1986, Campbell and Remington 1981). Noise from helicopters (Bleich et al. 1994), vehicle traffic, and harassment from dogs and humans may cause abandonment of habitat (Blong 1967, Blong and Pollard 1968). Although the increased amount of traffic may be slight, it would still likely have an effect on bighorn sheep and may influence their use of the water (Blong 1967, Hamilton et al. 1985). It is unlikely that the amount of vehicle traffic and human presence would cause abandonment of habitat but it may impede use from time to time (Hamilton et al. 1985).

Effects of Proposed BGG

The proposed action would be part of a series of four artificial water sources (two existing and two proposed) that would be approximately two to six miles apart. This would reduce the likelihood of water-stress related illness or mortality for bighorn sheep in the Sheep Hole Mountains. It could also facilitate range expansion and increase the size of the resident population. This would impact vegetation, which is limited in the Sheephole Mountains. While the vegetation may currently be adequate to support a resident population of approximately 50 to 60 sheep and the occasional bighorn migrating through, sheep counts indicate that the range does not support larger numbers of sheep

Although unlikely that disease vectors would find their way to these remote locations, artificial water sources in desert environments may provide breeding areas for *Culicoides sp.*, an invertebrate disease vector for bluetongue virus (Mullens 1989). A breeding habitat could be created through leakage of the components of the water source.

Desert-dwelling species have evolved in extremely arid environments and have adapted to the stochastic nature of water availability in the desert (Smith and Krausman 1988, Dunn 1996). Some data indicates that bighorn sheep can survive waterless years by consuming cacti (deVos 1997, Warrick and Krausman 1989, Watts 1979). These studies were conducted in the wetter deserts of southwestern Arizona and it is unlikely that viable populations of bighorn sheep in this area would persist without occasional access to water (V. Bleich, California Department of Fish and Game, personal communication, 12/01). Recent studies, while controversial, indicate that by providing artificial water sources for desert species, including bighorn sheep, it may reduce, over time, the ability of these species to survive long-term drought (Broyles 1995, Broyles and Cutler 1999).

Predation may increase as a result of the creation of additional artificial water sources. Animals in the desert tend to concentrate around any water source in general, and forage close to such sources. Long-term monitoring and research indicate that predators such as mountain lions, coyotes, and other predators hunt in and around these areas. Additional permanent water sources may attract these predators, resulting in increased predation on bighorn sheep.

Poaching would be encouraged around an artificial water source, as it is known that sheep congregate around water sources. While the removal of a single ram by legitimate licensed hunting is not expected to affect the population as a whole, illegal hunting has in the past been known to reduce numbers of sheep within the meta-population inhabiting this area.

The anticipated effect of increased bighorn sheep population levels and stability through increased water availability is not assured. There is no clear connection between increased water availability and increased populations (Broyles and Cutler 1999). Krausman and Etchberger (1993) did not detect an increase in productivity of mountain sheep in the Little Harquahala Mountains in Arizona when water

catchments were added. Instead, survival decreased (Krausman and Etchberger 1993). Current literature fails to establish a cause and effect relationship between additional water sources and increased wildlife populations (de Vos et.al. 1997, deVos and Clarkson 1990, Dunn 1996). Bighorn sheep in Mexico are doing well without water development while in the United States populations continue to decline despite an aggressive water development program over the past three decades (Lee 1993, Dunn 1996). Conversely, on the Kofa National Wildlife Refuge in Arizona, the installation of big game guzzlers in the Kofa Mountains resulted in an increase in the population (BLM files). It is important to note that bighorn sheep in Mexico are probably not faced with the same pressures and threats as bighorn sheep in the United States.

17.3 Cultural Resources

Driving vehicles up and down the access way comprises adaptive reuse of the former road, and would not have an effect on the historical integrity of the access. The temporary mining campsite at the base of the Sheep Hole Mountains would be avoided by project design, and would not be impacted as a consequence of the proposed project.

17.4 Geology and Soils

No impacts are anticipated regarding minerals or the general geology in regard to the proposed action.

Soils

During the construction the B (surface layer) and C soil horizons would be excavated. The subsurface soils would become disturbed by equipment use, and the very small fine textured soils would be susceptible to accelerated wind erosion and surface runoff from storm events. There would be some change in the soil surface profile, which may increase the potential for soil erosion. Soil contamination by hydraulic fluids, oils, or other lubricants may occur. The soil losses due to the proposed action are irreversible and irretrievable; however, this is anticipated to be minimal due to the very small area of disturbance.

Sheep tracks and trails may increase in the washes and hillsides near the BGG, causing soil disturbance and increased erosion.

It is estimated that a single storm event of 1.0" of rainfall would be needed for sufficient surface flow in the wash to eliminate or partially eliminate vehicle tracks. Rainfall patterns for the area, displayed in the Affected Environment section (17.12), indicate that there have been only 10 months, in the past eight years of rainfall data that experienced 1.0" or more of rainfall.

17.5 Hazardous Materials

It is anticipated that the proponents would not use any hazardous materials during

their implementation of the proposed action. However oil and other fluids could leak from equipment and contaminate soils. Any spillage of these fluids requires that the contaminated soil be treated as a hazardous waste according to the Environmental Protection Agency (USEPA) regulations.

17.6 Health and Safety

The remote locations, difficult access, use of hand and power tools and strenuous physical labor associated with the proposed action may lead to possible injuries and difficulty in securing prompt medical aid. Provisions for first aid, emergency communications, rest periods and rehydration are not addressed in the proposed action.

17.7 Land Use

Public Services and Utilities
No impacts associated with the proposed action are anticipated regarding public services and utilities.

Recreation
Impacts to recreation visitors are anticipated to be low during and after construction activities due to low visitor use levels. Impacts would be most noticeable to visitors during construction, inspection, maintenance, and re-filling activities. At other times, the low visibility of the BGG would leave it unnoticed to most observers.

The perceived impact would depend upon the perspective of the visitor. Hunters would likely see the impacts of construction, emergency maintenance, and re-filling activities as necessary and acceptable and view the BGG as beneficial to both the bighorn sheep and their recreation activities. Wilderness enthusiasts would likely see the impacts of construction, maintenance, and re-filling activities as unnecessary human activity, inappropriate installation of permanent facilities and inappropriate short and long-term use of motorized vehicles within wilderness. They would likely view an artificial water source as inappropriate human interference with natural processes. Public comments have been received regarding this proposed action that are consistent with these anticipated impacts.

If the proposed action results in increases in wildlife populations within the vicinity of the artificial water sources, it is anticipated that wildlife viewing and hunting opportunities would be improved.

17.8 Noise

Use of motorized vehicles in the construction phase would increase noise levels in the wilderness, along the Amboy Road at Sheep Hole Pass. Sounds of the vehicles and construction activities are anticipated to be limited to within 1.0 mile of the actual activity.

Sounds from post construction activities, such as emergency maintenance and re-fill actions would be similar to those of the construction phase for the ground vehicles. Inspections would be non-intrusive, as personnel would walk in to the site. Sounds of associated with any helicopter use are anticipated to be heard for much greater distances both inside and outside of the wilderness.

17.9 Paleontological Resources

No impacts associated with the proposed action are anticipated regarding paleontological resources.

17.10 Environmental Justice

The proposed action would not impact distinct Native American cultural practices and would not result in disproportionately high or adverse human health or environmental effects on minority communities.

17.11 Visual Resources

Upon completion of the proposed action, the actual constructed BGG is anticipated to have a very low level of visibility. In the short term, color and textural contrasts are anticipated where the tanks are buried and the site where excavated material was temporarily placed. Natural forces would reduce these contrasts; however the amount of time to achieve minimal contrast has not been established. Long term contrasts would arise from the rock dam, exposed metal-flex pipe at the dam, the vent pipe for the storage tank, and the concrete steps to the drinker, and the apron in front of the walk-in drinker. The fully installed facilities are not anticipated to exceed the limitations of Visual Resource Management (VRM) Class I.

Use of the route to S.D. site would change the character of the existing closed route to one with faint evidence of vehicular use. The visual contrast from one-time use of the vehicle tracks would not exceed the limitations of VRM Class I.

Surface Water
Minor amounts of runoff would be diverted to the guzzler during periods of precipitation. The small amount of diverted water would have a deminimus effect upon water resources.

Groundwater
Very small amounts of water would be captured in a localized area that would not be available to recharge the groundwater. The small amounts of water diverted would not have an appreciable impact upon the ground water regime.

17.13 Wilderness

Size:
The size of the Sheephole Valley Wilderness would not be affected.

Naturalness:
The proposed action would impact the naturalness of the Sheephole Valley Wilderness in four ways: 1) the addition of a permanent man-made structure within the wilderness; 2) the creation of new vehicle tracks in the wash;
3) additional use of vehicles and motorized equipment within the wilderness, and 4) the addition of artificial water sources to an environment primarily affected by natural processes.

The construction activities would impact naturalness in the immediate vicinity and from all points from which the site can be seen. The impact would be greatest during the construction activities. Once construction has been completed and the reclamation measures implemented as proposed, the installation would be noticeable but not dominant. Once the vegetation in the wash has recovered and on the re-created slopes covering the underground tanks, the visibility would be considerably reduced. The rock dams, exposed metal-flex pipes at the dams, the vent pipes for the storage tanks, and the concrete steps and aprons in front of the walk-in drinkers would remain visible but are anticipated to be subdued features in the landscape at distances in excess 200 feet.

Each time motor vehicles or motorized equipment would be used within wilderness the "primeval character and influence" would be compromised. The proposed action would result in the creation of about 0.5 mile of new vehicular tracks. These tracks, especially the 0.25 mile within the wash, would be clear and deep. Without further use, the tracks would eventually be obliterated by major storm events. According to rainfall data from 1994 through 2001 from the National Weather Service station in Twentynine Palms, the average length of time between months of 1.0" or more of accumulated rainfall was 9 ½ months and the longest time was 29 months (approximately 2 ½ years). There is no assurance that the first major storm event would obliterate the tracks created by initial construction activities. Raking the tracks at the wilderness boundary would reduce the visibility of the impact at the point of the wilderness boundary, but is not anticipated to eliminate the impact at the boundary, within sight of the boundary, or from vantage points within the wilderness.

Currently, 14 miles of existing vehicle tracks are used in the inspection and maintenance of artificial waters in this wilderness. Due to the terrain, such impacts are visible from the immediate vicinity and higher viewpoints that may be several miles away. As inspections for this BGG would be carried out on foot, and maintenance activities are minimal for this BGG design, creation of a well-defined way would not be expected.

Provision of water in the manner proposed would be inconsistent with the definition of wilderness in Section 2c of the Wilderness Act. Upon project completion, the wilderness area would generally appear “to have been affected primarily by the forces of nature”. However, human intervention and the provision of water in this situation would be inconsistent with a wilderness being “managed so as to preserve its natural conditions”. As a result, the proposed action would reduce wilderness values in this area; however it would be in a manner not readily visible to a visitor.

Opportunities for Solitude and Primitive Recreation:
Use of motorized vehicles and motorized equipment including a helicopter impacts the opportunities for solitude and primitive and unconfined recreation in a part of the wilderness. If no wilderness visitor is present to experience the impact, the opportunity is still compromised and the impact is not avoided. Each time a vehicle enters wilderness, the potential for such impact is realized. This impact is described as the percentage of the days in a year where any part of the wilderness is entered by a motorized vehicle and represents a reduction in the opportunity for solitude and primitive and unconfined recreation.

The construction phase would involve a 2 to 4 day period of impact to the opportunity for solitude within the wilderness.

Current CDFG authorized access ways have gates and fences at the wilderness boundary. The access ways in the proposed action do not. The vehicle tracks along the 0.25 mile of primitive way to the S.D. site are in rocky soil and cannot be raked out to the point of being unnoticeable. Use of the way to the S.D. site would leave visible evidence of recent vehicle use. This evidence would make it attractive to visitors and could result in increased illegal motor vehicle use of the way. Estimating such unauthorized use at once every other month (these tracks are visible from a well-traveled road) the resulting impact to solitude would be an additional 6 days per year.

Re-filling activities have been necessary in the past with the two existing artificial water sources in the Sheep Hole Mountains and it is anticipated that such activities would also be periodically needed for this site. Re-fill actions may occur more than once in a year for a specific guzzler. This activity could result in an additional one to two days each year that re-filling is necessary. The proposed action could result in an additional total of 7 to 13 days (1% to 3% of each year) when opportunities for solitude are impacted by vehicle use, both authorized and unauthorized, within the wilderness.

Special Features:
The anticipated affects on bighorn sheep, which are considered a special feature of the Sheephole Valley Wilderness, are discussed in the wildlife section.

Wilderness Act, Section 4c Conformance:
Delivery of staff, equipment, and supplies to the proposed sites involves using motor vehicles and motorized equipment. An alternate means of installation without use of motor vehicles and motorized equipment was considered. Transportation of the proposed heavy equipment using pack animals or via wagon over the sandy access ways was considered infeasible. This alternative would also require a greater number of workers for a longer amount of time to accomplish construction of the guzzlers. The use of motor vehicles and motorized equipment, as described in the proposed action, is the minimum necessary to accomplish the proposed action. The California Desert Protection Act of 1994 states that management activities to maintain and restore wildlife populations may be carried out within wilderness areas

and shall include use of motorized vehicles by appropriate State agencies.

18. ENVIRONMENTAL CONSEQUENCES: Alternative One

18.1 Air Quality

Minimal impacts associated with alternative one are anticipated regarding air quality.

18.2 Biological Resources

Plant Species
Anticipated impacts to botanical resources would be similar for this alternative as those noted for the proposed action. The long-term vehicle use affects would be lower due to the use of a helicopter or hiking in to access the site for major maintenance.

Threatened and Endangered Species
Anticipated impacts to biological resources would be similar for the proposed action and alternative one. Potential animal mortalities by vehicle impact would be reduced due to use of helicopters or hiking in during installation and major maintenance activities.

Wild and Free-Roaming Horses And Burros
Not Applicable.

Wildlife
Anticipated impacts to biological resources would be the same as for Threatened and Endangered species.

18.3 Cultural Resources

Anticipated impacts to cultural resources would be identical for the proposed action and alternative one.

18.4 Geology and Soils

Impacts are generally the same as the proposed action, however there is likely to be less compacting and soil disturbance over the long run due to hiking in or using a helicopter for maintenance activities.

Soils
Anticipated impacts to soils would be identical for the proposed action and alternative one.

18.5 Hazardous Materials

Anticipated impacts regarding hazardous materials would be identical for the proposed action and alternative one.

18.6 Health and Safety

Flight characteristics associated with helicopter use, proposed in alternative one, increase the potential for possible injuries addressed in consequences of the proposed action. While the availability of a helicopter would aid in securing prompt medical aid should injury occur, flight following procedures and helicopter safety briefings are not proposed, but would be required.

18.7 Land Use

Grazing
No impacts associated with alternative one are anticipated regarding grazing.

Minerals
No impacts associated with alternative one are anticipated regarding minerals.

Public Services and Utilities
No impacts associated with alternative one are anticipated regarding public services and utilities.

Recreation
No impacts associated with alternative one are anticipated regarding recreation.

18.8 Noise

Anticipated impacts for alternative one are greater than those for the Proposed Action due to the use of a helicopter to transport workers and supplies and to deliver to the site the initial 1,000 gallons of water to be put in the newly constructed tank. Such water delivery would take approximately 3 hours of helicopter time over the course of one day.

18.9 Paleontological Resources

No impacts associated with alternative one are anticipated regarding paleontological resources.

18.10 Environmental Justice

No impacts associated with alternative one are anticipated regarding environmental justice.

18.11 Visual Resources

The visual impacts would remain the same as described in alternative one.

18.12 Water Resources

Water resources are identical for alternative one and the proposed action. Possible impacts to surface water and ground water would be nominal, as stated for the proposed action.

18.13 Wilderness

Size: The size of the Sheephole Valley Wilderness would not be affected by adopting alternative one.

Naturalness: The impacts to the naturalness of the Sheephole Valley Wilderness would be similar to those described for the proposed action.
The use of one less truck and increased use of a helicopter would lessen the physical impacts created during installation.

Solitude and Primitive Recreation:

The impacts to the opportunities for solitude and primitive recreation would be greater than those described for the proposed action. This would be the result of the use of a helicopter to transport workers and supplies and to deliver to the site the initial 1,000 gallons of water. There would be a reduction in the opportunity for these experiences of one additional day during the construction phase. From the standpoint of solitude, the use of helicopters would be more intrusive than ground vehicles as the sight and sounds of helicopter use would carry farther than that of ground vehicles.

19. ENVIRONMENTAL CONSEQUENCES: No Action Alternative

The Proposed Action would not be undertaken as designed and the existing environment would be unchanged. Existing management and use of the site would continue subject to applicable statutes, regulations, policy and land use plans.

Due to the existing capacity of the current water guzzler systems and unpredictable rainfall patterns, bighorn sheep utilization would fluctuate with the seasonal availability of water and mortality due to water deprivation and increased stresses would likely result during extended periods of drought. The immediate needs of the sheep population in the Sheephole Valley Wilderness for water would not be met and objectives for better utilization of the range and distribution of sheep across the range would not be achieved. Under the worst scenario, the sheep population could be extirpated from the range due to the lack of reliable waters.

20. MITIGATION : Proposed Action

20.1 Air Quality

No mitigation measures are required.

20.2 Biological Resources

Vegetation and Invasive/Nonnative Species

1. Two vegetative plots should be located approximately one mile and two plots should be located approximately one-quarter mile from the water sources. Perennial plant composition should be monitored by weight and frequency of occurrence. Plots should be read every three years and a monitoring report submitted to the Needles Field Office. Plots should be established and monitored by a botanist, ecologist, or biologist.

2. Subsequent to ground disturbing activities, the area should be monitored for invasive/nonnative species. These species should be recorded and disseminated to the biannual inspectors.

3. If invasive/nonnative plant species become established or increase in density, the area of infestation should be mapped by the BGG inspectors and submitted to the Needles Field Office.

4. Any cacti within the wash area access route should be avoided by at least 10 feet.

Desert Bighorn Sheep

5. The BGG should be monitored at least two times per year for water level and maintenance needs. A report of each inspection should be submitted to the BLM California Desert District and Needles Field Office. Following installation of remote water level monitors, the water level data generated should be provided to Needles Field Office on a monthly basis.

6. The BGG should be tested for water quality at least once per year.

7. Insect traps should be set at least once per year and checked for disease vectors such as bot flies and horse flies.

8. Bighorn mortalities should be necropsied when possible and the results submitted to the BLM California Desert District and Needles Field Office.

Desert Tortoise

Conservation Measures from the FWS Small Disturbance Programmatic BO 1-8-97-F-17 would be applied to the S.D. BGG project. The purpose of the following measures would be to minimize anticipated impacts on the desert tortoise and its habitat. A "qualified" biologist or monitor is defined as a trained wildlife specialist who is knowledgeable concerning desert tortoise biology, tortoise mitigation techniques, tortoise habitat requirements, identification of tortoise sign, and procedures for surveying for tortoises.

9. Implementation of proposed mitigation measures should be ensured by the presence of a qualified wildlife biologist approved by BLM, who would observe activities at each individual work site (e.g., at an individual backhoe use area) at all times and would have the authority to halt activities that could endanger a tortoise, in order to prevent or avoid take of the species, as well as to ensure compliance with all desert tortoise mitigation measures. Simultaneous project activities should each require the presence of a qualified wildlife biologist.

10. A clearance survey should take place, not more than 24 hours prior to the beginning of vehicle access to the proposed work sites by the qualified wildlife biologist. At that time, tortoise burrows in the area should be flagged for avoidance.

11. No backhoe or vehicle activity should be allowed within 50 feet of any occupied tortoise hibernation/aestivation burrow.

12. To avoid accidental take of tortoises during activities, all project personnel should take part in an educational program covering the following topics:

- Personnel should be notified of the potential for the desert tortoise to occur in the project vicinity;
- Personnel should be advised that the tortoise is a threatened species and that there are penalties for take of listed species;
- Construction avoidance minimization and mitigation requirements should be identified and discussed and written copies of required avoidance, minimization and mitigation measures provided to all personnel. A BLM-approved biologist should administer the program.

13. Handling of desert tortoises should not be authorized for the proposed project.

14. Any holes temporarily created should be sloped at the end of each work day in such a manner as to allow wildlife to escape. All holes should be inspected for desert tortoise occupancy before work begins the following day. Any tortoise located within an open hole must be allowed to escape on its own.

15. In the event a desert tortoise is injured or killed, the on-site biologist should

be notified immediately, who in turn should contact the BLM wildlife biologist in Needles at (760) 326-7060, or through Dispatch (909) 383-5652. If the wildlife biologist is not available, the FWS Law Enforcement Branch should be notified at (310) 328-6307. An injured desert tortoise should be taken to the nearest veterinarian for treatment, by the biologist. Costs incurred should be the responsibility of CDFG.

16. All project site-related vehicular traffic should be confined to the flagged ways for each site. To assure observation and avoidance of tortoises and other wildlife along these ways, personnel should travel at a maximum speed of 10 mph.

17. Parking should be allowed only in pre-designated, flagged use areas. Personnel should inspect for tortoises under vehicles prior to use. If a tortoise is present, personnel should wait for the tortoise to move out from under the vehicle prior to driving.

18. All trash and food items should be contained in raven and coyote-proof containers and removed to an authorized disposal facility.

19. No dogs or firearms should be permitted on-site.

20. Following construction and removal of trash and equipment from the site, all disturbed soil surfaces should be scarified with equipment that should not harm root crowns in order to partially reverse the effects of soil compaction from use of the site, enhance re-vegetation, and reduce erosion. The Bureau should be notified when scarification is complete.

21. No later than 90 days after completion of construction or termination of activities, the qualified biologist should prepare a report for submission to the BLM. The report should document the effectiveness and practicality of the mitigation measures, the number of tortoises seen and burrows marked, and the number of tortoises killed or injured (if any). The report should make recommendations for modifying the measures to enhance tortoise protection or to make them more workable. The report should provide an estimate of the actual acreage disturbed by various aspects of the operation.

20.3 Cultural Resources

22. The temporary historic campsite located on a low-lying ridge within the drainage at the base of the Sheep Hole Mountains and adjacent locations of historic resources on the ridge should be avoided. Camping should be in a location, marked on the ground by the BLM archaeologist, which would not affect existing cultural resources

23. No collection of artifactual materials should be permitted at any time throughout this project.

20.4 Geology and Soils

No mitigation measures are required.

20.5 Hazardous Materials

24. Placement of a tarpaulin, plastic, or other protective device should be required to prevent oil and other fluids leaking from equipment from contaminating soils. Spillage of these fluids requires that the contaminated soil be treated as a hazardous waste according to the USEPA regulations. All costs associated with any cleanup should be borne by CDFG.

20.6 Health and Safety

25. An individual certified in first aid and cardio pulmonary resuscitation and equipped with a first aid kit should accompany each work crew. The contents of the first aid kit should be determined in consultation with a physician.

26. Project participants should be briefed on safety concerns associated with a desert environment and use of power and hand tools, and health related issues including the need for rest periods and rehydration.

27. A radio and/or cellular telephone should be available to each work crew for emergency related communications.

28. Telephone numbers, addresses, and maps of nearby emergency medical assistance should accompany each work crew.

29. Cool drinking water should be provided to each work crew in the amount of one gallon per person per day.

20.7 Land Use

No mitigation measures are required.

20.8 Noise

No mitigation measures are required.

20.9 Paleontological Resources

No mitigation measures are required.

20.10 Environmental Justice

No mitigation measures are required.

20.11 Visual Resources

No mitigation measures are required.

20.12 Water Resources

No mitigation measures are required.

20.13 Wilderness

26. Improvements to access ways should not be permitted.

27. Availability to the access ways utilized during periods of construction should be blocked and signed from all unauthorized vehicles.

28. Following completion of installation, the proposed access route within the wash should be rehabilitated for at least 1,000 feet, or the visual horizon, into the wilderness from the point of intersection with the Amboy Road. Rehabilitation should include vertical mulching, rock placement, and raking, to the point where no evidence remains of passage of vehicles. Only hand tools should be used.

21. MITIGATION: Alternative One

With the exception of Health and Safety, mitigation measures applicable to alternative one would be the same as for the Proposed Action.

Health and Safety
In addition to measures addressed under proposed action mitigation, helicopter flight following procedures should be followed and, project participants should be briefed on helicopter safety precautions.

22. RESIDUAL IMPACTS

22.1 Air Quality

No residual impacts are anticipated.

22.2 Biological Resources

Plant Species

A possible long-term change would be a change in plant species composition, perhaps caused by the presence of water, but mostly as a result of increased utilization of the area by foraging animals. Plant composition changes occur as a result of foraging pressure, favoring unpalatable or low value forage species over high value palatable species. Increased foraging also increases the presence of weedy exotics, such as Mediterranean grass, present at the site, and which would expect to increase over time due to competitive utilization of native forage plants.

In addition to long-term foraging effects, plant species composition could change along the access route. It would be expected that with evidence of vehicle travel that the access route to the BGG might be utilized by illegal vehicles, creating a tire track and access to the area for other weedy species, such as exotic euphorbia and grasses that are commonly introduced to an area by vehicles.

Wildlife

The proposed action is anticipated to have a positive affect on bighorn sheep populations by assuring that water levels within the developments are maintained. As bighorn sheep migrate, the residual effects of increased utilization of forage within the area would normally be minimal. However, because of the year-round presence of water in these areas, an additional residual effect could be a local increase in water dependent wildlife species, such as non-game species (thrashers, flycatchers and passerine birds) and game birds (quail, dove), small mammals (mice, rats) and insects, which would lead to an increase of predators of these species (snakes, hawks, owls and bats). Increased utilization of vegetative and landscape resources within the area would create a long-term increase in foraging around the new water resource, leading to eventual degradation of edible vegetation. This in turn could lead to variable population fluctuation of smaller wildlife populations that are unable to leave the area in search of food resources, and a corresponding unstable fluctuation of their predators. The effect of artificial water sources on wildlife populations remains highly speculative.

Threatened and Endangered Species

As the proposed action could cause an increase in competition of the desert tortoise with other species for biological resources within the area, effects could lead to a decrease in population levels for the species

With the long-term increase in water resources, could come an increase in predators such as ravens and coyotes as well as foxes, badgers, and other raptors who prey on both young and adult tortoises. Evidence exists for long term increased predator abundance in response to water development in the southwest (deVos 1997), especially for raptors. The result of increased predation over time would be a decrease in desert tortoise populations.

22.3 Cultural Resources

No residual impacts are anticipated.

22.4 Geology and Soils

No residual impacts are anticipated regarding geology.

The subsurface soils would become disturbed by equipment use, and the very small fine textured soils would be susceptible to accelerated wind erosion and surface runoff from storm events. There would be some change in the soil surface profile, which may increase the potential for soil erosion. The soil losses due to the proposed action are irreversible and irretrievable; however, this is anticipated to be minimal due to the very small area of disturbance.

Sheep tracks and trails may increase in the washes and hillsides near both artificial water sites, causing soil disturbance and increased erosion.

22.5 Hazardous Materials

No residual impacts are anticipated.

22.6 Health and Safety

No residual impacts are anticipated.

22.7 Land Use

Public Services and Utilities
No residual impacts are anticipated.

Recreation
Impacts to recreation visitors are anticipated to be low during and after construction activities due to low visitor use levels. The low visibility of the facilities would leave them unnoticed to most observers.

If the proposed action results in increases in wildlife populations within the vicinity of the artificial water sources, it is anticipated that wildlife viewing and hunting opportunities would be improved.

22.8 Noise

Use of helicopters and other motorized vehicles for construction and post-construction activities, such as maintenance, and re-fill actions, would increase noise levels in the wilderness, along the Amboy Road at Sheep Hole Pass, and along Patton Road. Sounds of most post-construction activities are anticipated to be limited to within 1.0 mile of the actual activity. Sounds of the helicopter are

anticipated to be heard for much greater distances both inside and outside of the wilderness.

22.9 Paleontological Resources

No residual impacts are anticipated.

22.10 Environmental Justice

No residual impacts are anticipated.

22.11 Visual Resources

Upon completion of the proposed action, the actual constructed facilities are anticipated to have a very low level of visibility. In the short term, color and textural contrasts are anticipated where the tanks are buried and the site where excavated material was temporarily placed. Natural forces would reduce these contrasts; however the amount of time to achieve minimal contrast has not been established. Long-term contrasts would arise from the rock dam, exposed metal-flex pipe at the dam, the vent pipe for the storage tank, and the concrete steps and apron in front of the walk-in drinker. The fully installed facilities are not anticipated to exceed the limitations of Visual Resource Management (VRM) Class I.

Continued use of the way to S.D. site for emergency maintenance would change the character of the existing closed route to one with evidence of faint vehicular use. The visual contrast from use of the vehicle tracks probably would not exceed the limitations of VRM Class I.

Use of the wash as access would leave clear and deep vehicle tracks where there are presently none. Without further use, the tracks would eventually be obliterated by major storm events, however, there is no assurance that the first major storm event would obliterate the tracks created by initial construction activities.

22.12 Water Resources

No residual impacts are anticipated.

22.13 Wilderness

Naturalness:
The proposed action would impact the naturalness of the Sheephole Valley Wilderness in four ways: 1) the addition of a permanent man-made structures within the wilderness; 2) the creation of new vehicle tracks; 3) additional use of vehicles and motorized equipment within the wilderness, and 4) the addition of artificial water sources to an environment primarily affected by natural processes.

Once construction would be completed and the reclamation measures implemented as proposed, the installation would be noticeable, but not dominant. Once the vegetation in the wash has recovered and on the re-created slopes covering the underground tanks, the visibility would be considerably reduced. The rock dams, exposed metal-flex pipes at the dams, the vent pipes for the storage tanks, and the concrete steps and aprons in front of the walk-in drinkers would remain visible but are anticipated to be subdued features in the landscape at distances in excess 200 feet.

Each time motor vehicles or motorized equipment is used within wilderness, the "primeval character and influence" is compromised. The proposed action would result in the creation of about 0.5 miles of new vehicular tracks. These tracks, especially within the wash would be clear and deep. Without further use, the tracks would eventually be obliterated by major storm events, however, there is no assurance that the first major storm event would obliterate the tracks created by initial construction activities. Rehabilitation of the tracks to the site at the wilderness boundary would reduce the visibility of the impact at that point, but is not anticipated to eliminate the impacts from vantage points within the wilderness.

Provision of water in the manner proposed would be inconsistent with the definition of wilderness in Section 2c of the Wilderness Act. Upon project completion, the wilderness area would generally appear “to have been affected primarily by the forces of nature”. However, human intervention and the provision of water in this situation would be inconsistent with a wilderness being “managed so as to preserve its natural conditions”. As a result, the proposed action would reduce wilderness values in this wilderness area; however it would be in a manner not readily visible to a visitor.

Opportunities for Solitude and Primitive Recreation:
The construction phase would involve a 2-day period of impact to the opportunity for solitude within the wilderness.

Current CDFG authorized access ways have gates and fences at the wilderness boundary. The access ways in the proposed action do not. The vehicle tracks to the S.D. site are in rocky soil and cannot be raked out to the point of being unnoticeable. Renewed use of the route to the S.D. site would leave visible evidence of recent vehicle use. This evidence would make it attractive to visitors and could result in increased illegal motor vehicle use of the route. This could cause an additional 6 days of illegal incursion into the wilderness.

Re-fill actions may occur more than once in a year for a specific guzzler. This activity could result in an additional 1 to 2 days each year that re-filling is necessary.

The proposed action could result in an additional total of 8 days (2% of each year) when opportunities for solitude are impacted by vehicle use, both authorized and unauthorized, within the wilderness. Added to the 10% of time already impacting the wilderness this means that the impacts would accrue to 12% of the year in which these activities would impact the wilderness.

23. CUMULATIVE IMPACTS

The CDFG initially requested that 6 new big game guzzlers be developed in the Sheep Hole and Calumet Mountains to support the bighorn sheep population in that area (Map 4A). The BLM objected to the incremental consideration of water developments and requested that the CDFG submit a bighorn sheep meta-population plan so that the cumulative impacts of these developments could be

properly addressed.

A bighorn sheep meta-population plan would establish management strategies for sustaining the meta-population of sheep for the area. A meta-population is defined as an association of genetically related animals that are constrained and shaped by habitat parameters (e.g., watering and lambing areas, migration patterns and barriers to migration, forage availability, etc.). The planning area often encompasses a large geographic area, including many mountain ranges in the case of bighorn sheep.

The CDFG agreed that the preparation of a meta-population plan was warranted, however, they requested that two sites, one of which is discussed in this EA, be constructed as preventative measures against sheep die off during drought years pending completion of the bighorn sheep meta-population plan for this area. Based on an agreement between the BLM and CDFG, the preparation of a meta-population plan would be required prior to BLM's consideration of any additional guzzler sites, other than the S.D. and Upper Surprise guzzlers to be located in the Sheephole Mountains Wilderness area. Accordingly, without a meta-population plan, installation of additional guzzlers is not considered a reasonably foreseeable future scenario at this time.

Nevertheless, the following cumulative impact analysis addresses the installation of additional guzzlers based on CDFG's initial request and reflects the limited information available within the time period needed to respond to the CDFG's need to install the proposed S.D. BGG.

Cumulative impacts are those impacts on the environment which result "from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." (40 CFR 1508.7). In this case, past and presently on-going actions and activities include: Two big game guzzlers installed at the request of the CDFG in the Sheep Hole Mountains (Bear Claw and Suds Hole guzzlers); three small game guzzlers; three tinajas which have been reinforced; vehicle access by CDFG and volunteers to monitor and maintain the guzzlers; vehicle travel on Highway 62, Amboy Road, and a salt mining haul road which accesses Cadiz Dry Lake; aircraft use by the U.S. Marine Corps Air Ground Combat Center to the west of the sites; private civilian aircraft use; CDFG helicopter use to conduct population census, capture for data collection and radio collar installation, and monitoring and maintenance (including refilling) of guzzlers; and BLM aircraft use for wilderness monitoring.

The primary cumulative impacts would be on biological resources and on wilderness values.

Bighorn sheep and other species of wildlife may become increasingly reliant upon artificial water sources for their existence and populations may become unnaturally increased. This reliance could multiply with the installation of additional artificial water sources in the Calumet and Sheep Hole Mountains, and could have potential

long-term effects on all local populations of wildlife species, due to an increase of potential year-round water sources, and a potential increase in herbivorous species' numbers and distribution.

Bighorn sheep populations, while not cyclic in the sense that hares and owls in the arctic are, exhibit boom and bust qualities (Quinn and Hastings 1987). Under a worst case scenario, with installation of more guzzlers in the desert, bighorn sheep populations may increase initially, then crash if the forage in this sparsely vegetated area fails to support them. Currently insufficient data and information is available to determine if this could happen. The preparation of a meta-population plan is key to adequately assessing the impacts of future water developments in the area on bighorn sheep.

Each additional guzzler would require construction activities and access similar to that in the proposed action. Each would require regular inspection and maintenance and may require water delivery during extended periods of drought. This would result in increased operation of aircraft and ground vehicles within the wilderness and the establishment of additional permanently used vehicle ways within the wilderness. Construction equipment may be operated at the sites to repair damage by major storms. This would multiply the long-term effects as stated above upon wildlife with each guzzler construction.

The use of vehicles in wilderness is anticipated to increase over time. Currently, 14 miles of existing vehicle ways are used in the inspection and maintenance of artificial waters in this wilderness. Due to the terrain, such impacts are visible from the immediate vicinity and from elevated viewpoints on the slopes of the Sheep Hole Mountains and Calumet Mountains. The proposed action in the Calumet would add 11 miles of new and 1 mile of existing vehicle tracks that would be used by vehicles on at least a semi-annual basis. Construction of the other four anticipated artificial waters would result in use of vehicles on an additional 20 miles of new or existing vehicle tracks. The cumulative total would be 42 miles of vehicle tracks being used by motorized vehicles within the wilderness on at least a semi-annual basis. Past weather patterns indicate it is unlikely that these tracks would be obliterated by storm events for other than brief, widely spaced periods.

Past weather patterns and management actions indicate it is likely that there would be future re-fill actions for the guzzlers. If a total of eight guzzlers were ultimately installed, re-fill actions could become commonplace in this wilderness and at a level four times greater than at present. Opportunities for solitude are currently compromised for approximately 38 days each year. The proposed action and the Upper Surprise action would result in an additional 20 to 28 days in each year being directly and indirectly compromised. Construction of the other 4 anticipated artificial waters would result in additional use of vehicles for 6 days per year for inspection and minor maintenance. Activity resulting from additional research or management activities regarding bighorn sheep is estimated to add 4 days per year. Re-fill actions for the 8 guzzlers are anticipated to add 16 to 24 days per year when needed (re-filling 4-6 guzzlers twice in a season). Efforts to stop illegal vehicle use in this wilderness may improve the situation, but are not anticipated to be entirely

successful. It is estimated that there would still be 2 illegal vehicular incursions per month overall, which is included in the existing environment estimate of 38 days. As a result, the cumulative negative impacts to opportunities for solitude are anticipated to be 68 to 100 days, or 19% to 27% of each year.

Construction of one artificial water source degrades wilderness integrity incrementally through exempting the prohibitions of section 4c of the Wilderness Act. Those activities within wilderness include establishing 42 miles of permanent vehicle ways; continual use of motor vehicles, motorized equipment, mechanical transport, and landing of aircraft; and construction of permanent structures and installations. Each additional big game guzzler incrementally impacts the wilderness resource. Construction, operation, repairs, and maintenance of a total of eight artificial water sources in the Sheephole Valley Wilderness has the potential for compromising its wilderness integrity.

Goal #3 in the Wilderness Element of the CDCA Plan would not be met as the system of constructed artificial waters do not allow for the management of "...a wilderness system in an unimpaired state, preserving wilderness values and primitive recreation opportunities, while providing for acceptable use."

CDCA Plan and the California Desert Protection Act of 1994 direct management to be consistent with The Wilderness Act. However the California Desert Protection Act of 1994 also included a provision that specifically allowed management activities within wilderness areas to maintain or restore wildlife populations and the habitats to support such populations. Furthermore that Act provided for the use of motorized vehicles by appropriate State agencies in carrying out wildlife management activities. There is no documentation to demonstrate that a system of eight constructed artificial waters or any other number of artificial waters is the "... minimum necessary requirement for the administration of the area for the purpose of this Act" (section 4c of The Wilderness Act).

24. CONSULTATION AND PUBLIC NOTIFICATION

24.1 Agency Consultation

On April 18, 2002, the BLM submitted to the U.S. Fish and Wildlife Service (FWS), a Biological Evaluation for the proposed S.D. and Upper Surprise BGG projects. Consultation for these projects was initiated by the FWS on April 26, 2002.

As a result of a Bureau of Land Management California Desert District Office Email of April 03, 2003, from Larry Foreman, Wildlife Biologist, to Judy Hohman and Tim Thomas of the U.S. Fish and Wildlife Service (FWS); and a telephone conference of May 7, 2003, between George Meckfessel and Karen Harville of the Needles Field Office, and Judy Hohman and Robert McMorran of FWS; the Bureau sent a letter on May 18 to FWS requesting withdrawal from formal consultation that portion of the Proposed Installation/Operation of the S.D. and Upper Surprise Big Game Guzzlers (BGG) Project which proposes the S.D. Big Game Guzzler project, located in the Sheep Hole Mountains.

The Bureau is applying the small disturbance programmatic BO 1-8-97-F-17 to the S.D. BGG project, which has a disturbance of 2.3 acres, most of which is along a primitive historic roadway and on a rocky slope, which are unsuitable as desert tortoise habitat. Suitable habitat is found along the access route, which traverses 0.25 mile of desert tortoise habitat, before accessing the primitive way. The Small Disturbance BO form and Location Map were mailed to the FWS on May 20, 2003 from the District Office for a 30 day review.

24.2 Public Notification

Notification of the proposed action and analysis has been prominently posted in the Needles Field Office public area and on the Field Office web page during its undertaking. A Notice of Proposed Action (NOPA) CA690-01-04, was mailed to 75 members of the public and other agencies who have expressed interest in proposals affecting wilderness. The NOPA was mailed on July 3, 2001 and generated 12 responses. Support of the proposed project was expressed by the Society for the Conservation of Bighorn Sheep. Eight letters of opposition were received from individuals. An additional three letters of opposition were received from organizations. Those organizations were Desert Survivors, Escalante Wilderness Project, and Wilderness Watch.

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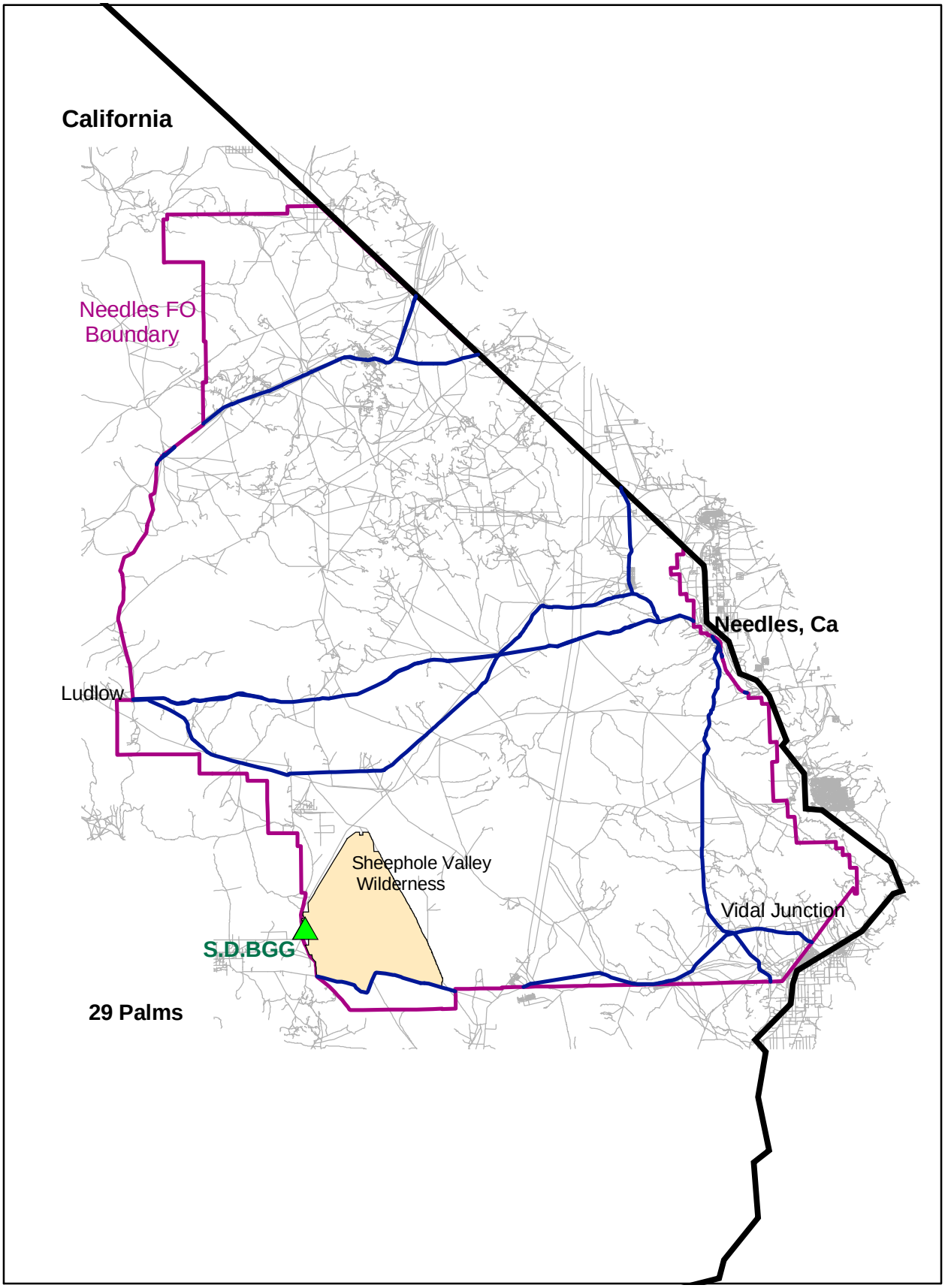
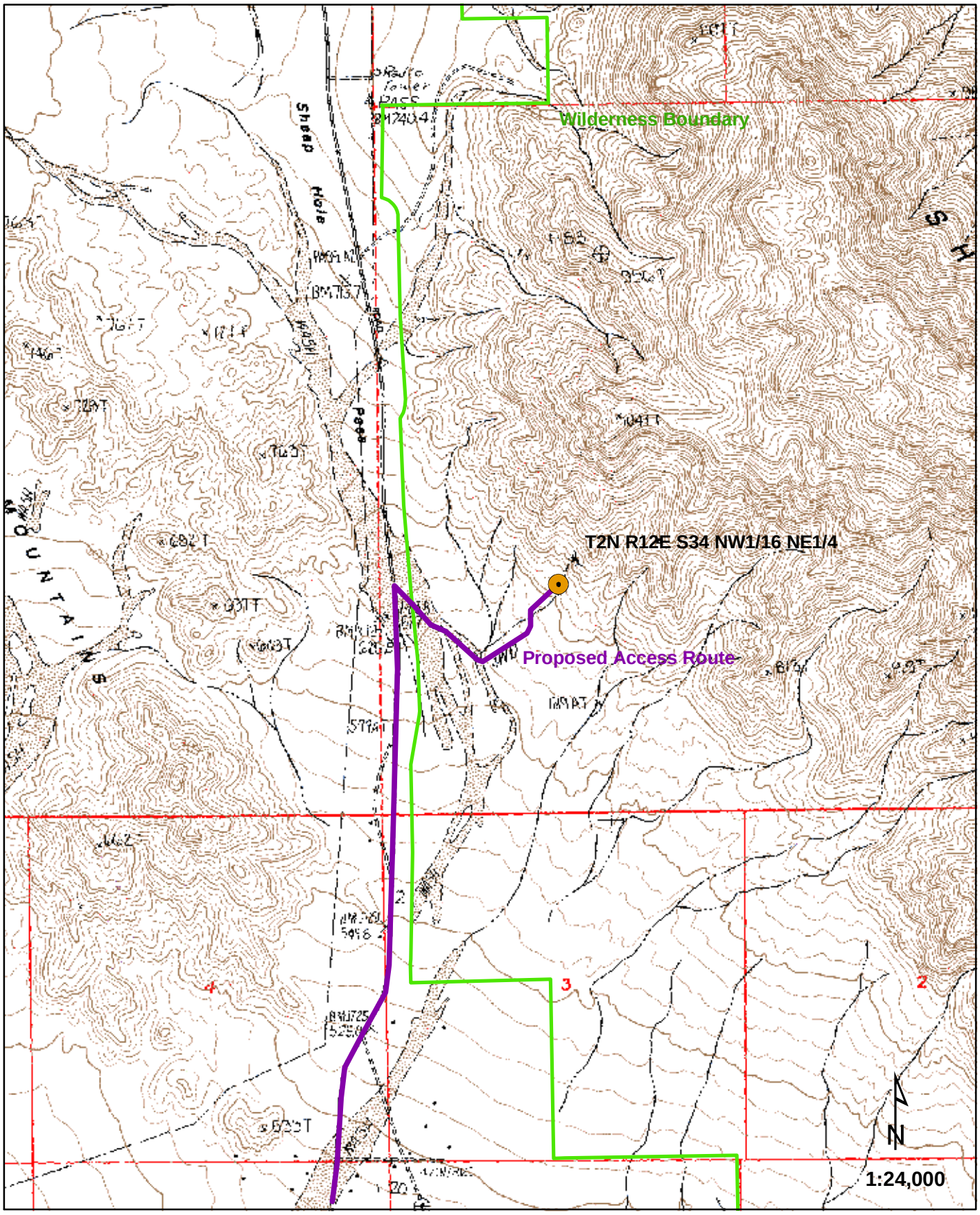
MAP 1A
Proposed S.D.BGG
General Location



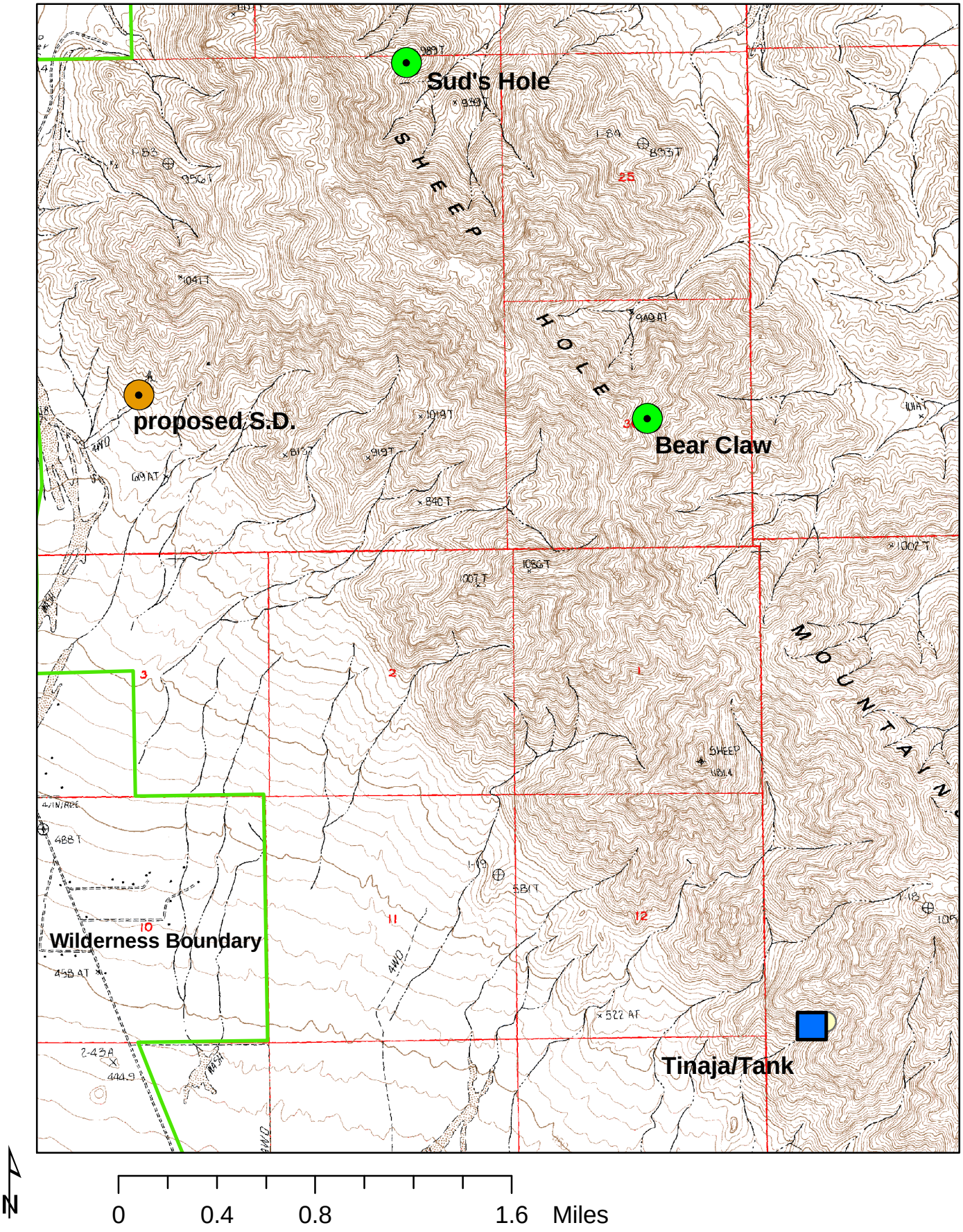
MAP 2A
PROPOSED SD BIG GAME GUZZLER



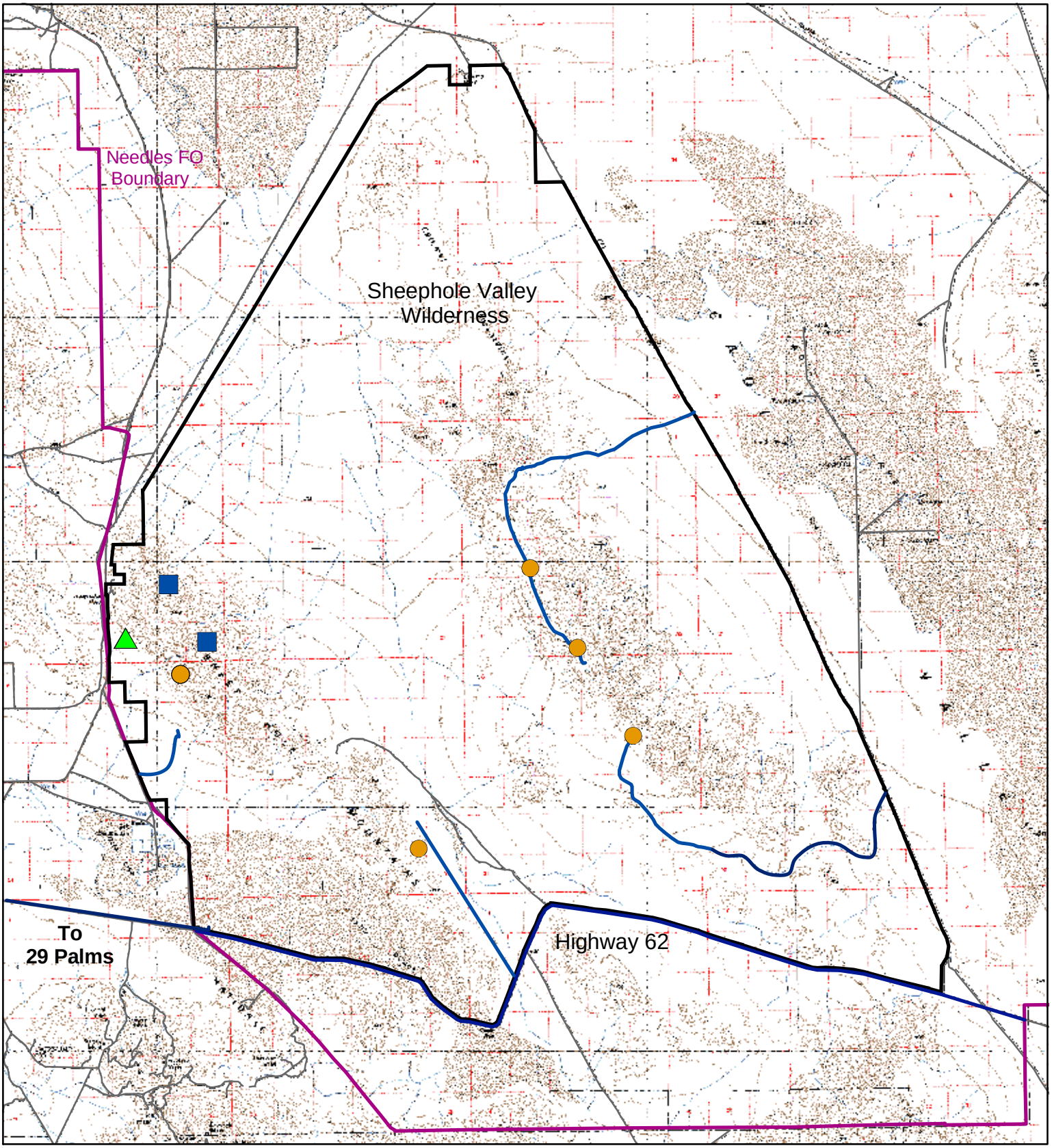
29 Palms - 22 miles

0 0.1 0.2 0.4 0.6 0.8 1 Miles

MAP 3A
PROPOSED SD BIG GAME GUZZLER
Pre-Existing Artificial/Developed Waters



MAP 4A
Proposed S.D.BGG Project
Proposed and Existing BGGs



LEGEND

- Proposed BGG
- Existing BGG
- Proposed S.D.
- Proposed Route

0 1.5 3 6 Miles

N

FIGURE 1
PROPOSED SD BIG GAME GUZZLER
General Site Layout